

10/655,684
200311300-1

3

LISTING OF CLAIMS

1. (previously presented) A color forming composition, comprising:
 - a) a leuco dye;
 - b) an infrared absorber admixed with or in thermal contact with the leuco dye; and
 - c) a stabilizer selected from the group consisting of thiolane-nickel complex, spiroindane, and mixtures thereof, wherein said stabilizer is admixed with the infrared absorber.
2. (previously presented) The composition of claim 1, wherein the stabilizer is selected from the group consisting of bis(4-dimethylaminodithiobenzil)nickel; tetrabutyl-phosphonium (SP-4-1)-bis[4,5-di(mercaptopo- κ S)-1,3-dithiole-2-thionato(2)]nickelate(1-) (9CI); 1,1'-spirobi[1H-indene]-5,5',6,6'-tetrol-2,2',3,3'-tetrahydro-3,3,3',3'-tetramethyl- (9CI); 1,1'-spirobi[1H-indene]-2,2',3,3'-tetrahydro-3,3,3',3'-tetramethyl-5,5',6,6'-tetrapropoxy- (9CI); and mixtures thereof.
3. (cancelled).
4. (previously presented) The composition of claim 1, wherein the infrared absorber is selected from the group consisting of pyrimidinetrione-cyclopentylidenes, guaizonyl dyes, croconium dyes, and mixtures thereof.
5. (previously presented) The composition of claim 4, wherein the infrared absorber is selected from the group consisting of pyrimidinetrione-cyclopentylidene and guaizonyl dye and the stabilizer is a nickel dithiolane complex.
6. (previously presented) The composition of claim 5, wherein the infrared absorber is selected from the group consisting of 2,4,6(1H,3H,5H)-pyrimidinetrione 5-[2,5-bis[(1-ethyl-1,3-dihydro-3,3-dimethyl-2H-indol-2-ylidene)ethylidene]cyclopentylidene]- (9CI); 2,4,6(1II,3II,5II)-pyrimidinetrione 5-

10/655,684
200311300-I

4

[2,5-bis[(1,3-dihydro-1,1,3-trimethyl-2H-benz[e]indol-2-ylidene)ethylidene]cyclopentylidene]-1,3-dimethyl- (9CI); methanaminium N-[5-[3-[5-(dimethylamino)-2-thienyl]-2-hydroxy-4,5-dioxo-2-cyclopenten-1-ylidene]-2(5H)-thienylidene]-N-methyl- inner salt (9CI); cyclobutenediylium 1,3-bis[3,8-dimethyl-5-(1-methylethyl)-1-azulenyl]-2,4-dihydroxy- bis(inner salt) (9CI); and mixtures thereof.

7. (previously presented) The composition of claim 1, wherein the color forming composition is optimized for development using infrared radiation having a wavelength of from about 750 nm to about 900 nm.

8. (previously presented) The composition of claim 1, wherein the leuco dye is selected from the group consisting of fluorans, phthalides, amino-triarylmethanes, aminoxanthenes, aminothioxanthenes, amino-9,10-dihydro-acridines, aminophenoazazines, aminophenothiazines, aminodihydro-phenazazines, aminodiphenylmethanes, aminohydrocinnamic acids and corresponding esters, 2(p-hydroxyphenyl)-4,5-diphenylimidazoles, indanones, leuco indamines, hydrozines, leuco indigoid dyes, amino-2,3-dihydroanthraquinones, tetrahalo-p,p'-biphenols, 2(p-hydroxyphenyl)-4,5-diphenylimidazoles, phenethylanilines, and mixtures thereof.

9. (previously presented) The composition of claim 1, further comprising an anti-oxidant selected from the group consisting of chroman, vitamin E, vitamin E analogs, astaxanthin, ascorbic acid, carotene, and mixtures thereof.

10. (previously presented) A color forming composition, comprising:

- a) a leuco dye;
- b) an infrared absorber admixed with or in thermal contact with the leuco dye; and
- c) an anti-fade agent selected from the group consisting of chroman, vitamin E, vitamin E analogs, astaxanthin, ascorbic acid, carotene, and mixtures thereof, wherein said anti-fade agent is admixed with the leuco dye.

10/655,684
200311300-1

5

11. (previously presented) The composition of claim 10, wherein the anti-fade agent is selected from the group consisting of chroman, vitamin E, vitamin E analogs, astaxanthin, and mixtures thereof.

12. (previously presented) The composition of claim 11, wherein the anti-fade agent is chroman.

13. (previously presented) The composition of claim 11, wherein said leuco dye is a fluoran.

14. (previously presented) The composition of claim 10, wherein the leuco dye is selected from the group consisting of fluorans, phthalides, amino-triaryl methanes, aminoxanthenes, aminothioxanthenes, amino-9,10-dihydro-acridines, aminophenoxazines, aminophenothiazines, aminodihydro-phenazines, aminodiphenylmethanes, aminohydrocinnamic acids and corresponding esters, 2(p-hydroxyphenyl)-4,5-diphenylimidazoles, indanones, leuco indamines, hydrozines, leuco indigojd dyes, amino-2,3-dihydroanthraquinones, tetrahalo-p,p'-biphenols, 2(p-hydroxyphenyl)-4,5-diphenylimidazoles, phenethylanilines, and mixtures thereof.

15. (previously presented) The composition of claim 10, wherein the infrared absorber is selected from the group consisting of pyrimidinetrione-cyclopentylidenes, guaizonyl dyes, croconium dyes, and mixtures thereof.

16. (previously presented) The composition of claim 10, wherein the color forming composition is spin-contable.

17-44. (cancelled).

45. (previously presented) A color forming composition, comprising:

- a) a leuco dye;
- b) an infrared absorber admixed with or in thermal contact with the leuco dye; and

10/655,684
200311300-1

6

c) a chroman stabilizer admixed with the infrared absorber, said chroman stabilizer configured for both stabilizing the infrared absorber and inhibiting oxidation of the leuco dye.

46. (previously presented) The composition of claim 45, wherein the infrared absorber is selected from the group consisting of pyrimidinetrione-cyclopentylidenes, guaizonyl dyes, croconium dyes, and mixtures thereof.

47. (previously presented) The composition of claim 46, wherein the infrared absorber is selected from the group consisting of pyrimidinetrione-cyclopentylidene and guaizonyl dye.

48. (previously presented) The composition of claim 47, wherein the infrared absorber is selected from the group consisting of 2,4,6(1II,3II,5II)-pyrimidinetrione 5-[2,5-bis[(1-ethyl-1,3-dihydro-3,3-dimethyl-2H-indol-2-ylidene)ethylidene]cyclopentylidene]- (9CI); 2,4,6(1II,3II,5II)-pyrimidinetrione 5-[2,5-bis[(1,3-dihydro-1,1,3-trimethyl-2II-benz[e]indol-2-ylidene)ethylidene]cyclopentylidene]-1,3-dimethyl- (9CI); methanaminium N-[5-[3-[5-(dimethylamino)-2-thienyl]-2-hydroxy-4,5-dioxo-2-cyclopenten-1-ylidene]-2(5II)-thienylidene]-N-methyl- inner salt (9CI); cyclobutenediylium 1,3-bis[3,8-dimethyl-5-(1-methylethyl)-1-azulenyl]-2,4-dihydroxy- bis(inner salt) (9CI); and mixtures thereof.

49. (previously presented) The composition of claim 45, wherein the color forming composition is optimized for development using infrared radiation having a wavelength of from about 750 nm to about 900 nm.

50. (previously presented) The composition of claim 45, wherein the leuco dye is selected from the group consisting of fluorans, phthalides, amino-triarylmethanes, aminoxanthenes, aminothioxanthenes, amino-9,10-dihydro-acridines, aminophenoxazines, aminophenothiazines, aminodihydro-phenazines, aminodiphenylmethanes, aminohydrocinnamic acids and corresponding esters, 2(p-hydroxyphenyl)-4,5-diphenylimidazoles, indanones, leuco indamines, hydrozines,

10/655,684
200311300-1

7

leuco indigoid dyes, amino-2,3-dihydmanthraquinones, tetrahalo-p,p'-biphenols, 2(p-hydroxyphenyl)-4,5-diphenylimidazoles, phenethylanilines, and mixtures thereof.

51. (previously presented) The composition of claim 45, further comprising an anti-oxidant selected from the group consisting of vitamin E, vitamin E analogs, astaxanthin, ascorbic acid, carotene, and mixtures thereof.

52. (previously presented) A color forming composition, comprising:

- a) a leuco dye;
- b) an infrared absorber admixed with or in thermal contact with the leuco dye;
- c) a chroman stabilizer admixed with the infrared absorber, said chroman stabilizer formulated for stabilizing the infrared absorber; and
- d) an anti-oxidant, other than the chroman stabilizer, formulated for inhibiting oxidation of the leuco dye.

53. (previously presented) The composition of claim 52, wherein the infrared absorber is selected from the group consisting of pyrimidinetrione-cyclopentylidenes, guaizonyl dyes, croconium dyes, and mixtures thereof.

54. (previously presented) The composition of claim 53, wherein the infrared absorber is selected from the group consisting of pyrimidinetrione-cyclopentylidene and guaizonyl dye and the stabilizer is a nickel dithiolane complex.

55. (previously presented) The composition of claim 54, wherein the infrared absorber is selected from the group consisting of 2,4,6(1H,3H,5H)-pyrimidinetrione 5-[2,5-bis[(1-ethyl-1,3-dihydro-3,3-dimethyl-2H-indol-2-ylidene)ethylidene]cyclopentylidene]- (9Cl); 2,4,6(1H,3H,5H)-pyrimidinetrione 5-[2,5-bis[(1,3-dihydro-1,1,3-trimethyl-2H-benz[c]indol-2-ylidene)ethylidene]cyclopentylidene]-1,3-dimethyl- (9Cl); methanaminium N-[5-[3-[5-(dimethylamino)-2-thienyl]-2-hydroxy-4,5-dioxo-2-cyclopenten-1-ylidene]-2(5H)-thienylidene]-N-methyl- inner salt (9Cl); cyclobutenediylium 1,3-bis[3,8-dimethyl-5-

10/655,684
200311300-1

8

(1-methylethyl)-1-azulenyl]-2,4-dihydroxy- bis(inner salt) (9CI); and mixtures thereof.

56. (previously presented) The composition of claim 52, wherein the color forming composition is optimized for development using infrared radiation having a wavelength of from about 750 nm to about 900 nm.

57. (previously presented) The composition of claim 52, wherein the leuco dye is selected from the group consisting of fluorans, phthalides, amino-triarylmethanes, aminoxanthenes, aminothioxanthenes, amino-9,10-dihydro-acridines, aminophenoxazines, aminophenothiazines, aminodihydro-phenazines, aminodiphenylmethanes, aminohydrocinnamic acids and corresponding esters, 2(p-hydroxyphenyl)-4,5-diphenylimidazoles, indanones, leuco indamines, hydroazines, leuco indigoid dyes, amino-2,3-dihydroanthraquinones, tetrahalo-p,p'-biphenols, 2(p-hydroxyphenyl)-4,5-diphenylimidazoles, phenethylanilines, and mixtures thereof.

58. (previously presented) The composition of claim 52, wherein the antioxidant is selected from the group consisting of vitamin E, vitamin E analogs, astaxanthin, ascorbic acid, carotene, and mixtures thereof.

59. (previously presented) A color forming article, comprising:

- a) a leuco dye;
- b) an infrared absorber admixed with or in thermal contact with the leuco dye; and
- c) a stabilizer selected from the group consisting of thiolane-nickel complex, spiroindane, and mixtures thereof, wherein said stabilizer is overprinted with respect to the infrared absorber.

60. (previously presented) The article of claim 59, wherein the stabilizer is selected from the group consisting of bis(4-dimethylaminodithiobenzil)nickel; tetrabutyl-phosphonium (SP-4-1)-bis[4,5-di(mercaptop- κ S)-1,3-dithiole-2-thionato(2)]nickelate(1-) (9CI); 1,1'-spirobi[1,1-indene]-5,5',6,6'-tetrol-2,2',3,3'-

10/655,684
200311300-1

9

tetrahydro-3,3,3',3'-tetramethyl- (9CI); 1,1'-spirobi[1H-indene]-2,2',3,3'-tetrahydro-3,3,3',3'-tetramethyl-5,5',6,6'-tetrapropoxy- (9CI); and mixtures thereof.

61. (previously presented) The article of claim 59, wherein the infrared absorber is selected from the group consisting of pyrimidinetrione-cyclopentylidenes, guaizonyl dyes, croconium dyes, and mixtures thereof.

62. (previously presented) The article of claim 61, wherein the infrared absorber is selected from the group consisting of pyrimidinetrione-cyclopentylidene and guaizonyl dye and the stabilizer is a nickel dithiolane complex.

63. (previously presented) The article of claim 62, wherein the infrared absorber is selected from the group consisting of 2,4,6(1H,3H,5H)-pyrimidinetrione 5-[2,5-bis[(1-ethyl-1,3-dihydro-3,3-dimethyl-2H-indol-2-ylidene)ethylidene]cyclopentylidene]- (9CI); 2,4,6(1H,3H,5H)-pyrimidinetrione 5-[2,5-bis[(1,3-dihydro-1,1,3-trimethyl-2H-benz[e]indol-2-ylidene)ethylidene]cyclopentylidene]-1,3-dimethyl- (9CI); methanaminium N-[5-[3-[5-(dimethylamino)-2-thienyl]-2-hydroxy-4,5-dioxo-2-cyclopenten-1-ylidene]-2(5H)-thienylidene]-N-methyl- inner salt (9CI); cyclobutenediylium 1,3-bis[3,8-dimethyl-5-(1-methylethyl)-1-azulenyl]-2,4-dihydroxy- bis(inner salt) (9CI); and mixtures thereof.

64. (previously presented) The article of claim 59, wherein the color forming article is optimized for development using infrared radiation having a wavelength of from about 750 nm to about 900 nm.

65. (previously presented) The article of claim 59, wherein the leuco dye is selected from the group consisting of fluorans, phthalides, amino-triarylmethanes, aminoxanthenes, aminothioxanthenes, amino-9,10-dihydro-acridines, aminophenoxyazines, aminophenothiazines, aminodihydro-phenazines, aminodiphenylmethanes, aminohydrocinnamic acids and corresponding esters, 2(p-hydroxyphenyl)-4,5-diphenylimidazoles, indanones, leuco indamines, hydrozines,

10/655,684
200311300-1

10

leuco indigoid dyes, amino-2,3-dihydroanthraquinones, tetrahalo-p,p'-biphenols, 2(p-hydroxyphenyl)-4,5-diphenylimidazoles, phenethylanilines, and mixtures thereof.

66. (previously presented) The article of claim 59, further comprising an antioxidant selected from the group consisting of chroman, vitamin E, vitamin E analogs, astaxanthin, ascorbic acid, carotene, and mixtures thereof.

67. (previously presented) A color forming article, comprising:

- a) a leuco dye;
- b) an infrared absorber admixed with or in thermal contact with the leuco dye; and
- c) a chroman stabilizer overprinted with respect to the infrared absorber, said chroman stabilizer configured for both stabilizing the infrared absorber and inhibiting oxidation of the leuco dye.

68. (previously presented) The article of claim 67, wherein the infrared absorber is selected from the group consisting of pyrimidinetrione-cyclopentylidenes, guaizonyl dyes, croconium dyes, and mixtures thereof.

69. (previously presented) The article of claim 68, wherein the infrared absorber is selected from the group consisting of pyrimidinetrione-cyclopentylidene and guaizonyl dye.

70. (previously presented) The article of claim 69, wherein the infrared absorber is selected from the group consisting of 2,4,6(1H,3H,5H)-pyrimidinetrione 5-[2,5-bis[(1-ethyl-1,3-dihydro-3,3-dimethyl-2H-indol-2-ylidene)ethylidene]cyclopentylidene]- (9CI); 2,4,6(1H,3H,5H)-pyrimidinetrione 5-[2,5-bis[(1,3-dihydro-1,1,3-trimethyl-2H-benz[e]indol-2-ylidene)ethylidene]cyclopentylidene]-1,3-dimethyl- (9CI); methanaminium N-[5-[3-[5-(dimethylamino)-2-thienyl]-2-hydroxy-4,5-dioxo-2-cyclopenten-1-ylidene]-2(5H)-thienylidene]-N-methyl- inner salt (9CI); cyclobutenediylium 1,3-bis[3,8-dimethyl-5-(1-methyllethyl)-1-azulenyl]-2,4-dihydroxy- bis(inner salt) (9CI); and mixtures thereof.

10/655,684
200311300-1

11

71. (previously presented) The article of claim 67, wherein the color forming article is optimized for development using infrared radiation having a wavelength of from about 750 nm to about 900 nm.

72. (previously presented) The article of claim 67, wherein the leuco dye is selected from the group consisting of fluorans, phthalides, amino-triarylmethanes, aminoxanthenes, aminothioxanthenes, amino-9,10-dihydro-acridines, aminophenoxazines, aminophenothiazines, aminodihydro-phenazines, aminodiphenylmethanes, aminohydrocinnamic acids and corresponding esters, 2(p-hydroxyphenyl)-4,5-diphenylimidazoles, indanones, leuco indamines, hydrozines, leuco indigold dyes, amino-2,3-dihydroanthraquinones, tetrahalo-p,p'-biphenols, 2(p-hydroxyphenyl)-4,5-diphenylimidazoles, phenethylanilines, and mixtures thereof.

73. (previously presented) The article of claim 67, further comprising an anti-oxidant selected from the group consisting of vitamin E, vitamin E analogs, astaxanthin, ascorbic acid, carotene, and mixtures thereof.

74. (previously presented) A color forming article, comprising:

- a) a leuco dye;
- b) an infrared absorber admixed with or in thermal contact with the leuco dye;
- c) a chroman stabilizer overprinted with respect to the infrared absorber, said chroman stabilizer formulated for stabilizing the infrared absorber; and
- d) an anti-oxidant, other than the chroman stabilizer, formulated for inhibiting oxidation of the leuco dye.

75. (previously presented) The article of claim 74, wherein the infrared absorber is selected from the group consisting of pyrimidinetrione-cyclopentylidene, guaizonyl dyes, croconium dyes, and mixtures thereof.

76. (previously presented) The article of claim 75, wherein the infrared absorber is selected from the group consisting of pyrimidinetrione-cyclopentylidene and guaizonyl dye and the stabilizer is a nickel dithiolane complex.

10/655,684
200311300-1

12

77. (previously presented) The article of claim 76, wherein the infrared absorber is selected from the group consisting of 2,4,6(1H,3H,5H)-pyrimidinetrione 5-[2,5-bis[(1-ethyl-1,3-dihydro-3,3-dimethyl-2H-indol-2-ylidene)ethylidene]cyclopentylidene]- (9CI); 2,4,6(1H,3H,5H)-pyrimidinetrione 5-[2,5-bis[(1,3-dihydro-1,1,3-trimethyl-2H-benz[e]indol-2-ylidene)ethylidene]cyclopentylidene]-1,3-dimethyl- (9CI); methanaminium N-[5-[3-[5-(dimethylamino)-2-thienyl]-2-hydroxy-4,5-dioxo-2-cyclopenten-1-ylidene]-2(5H)-thienylidene]-N-methyl- inner salt (9CI); cyclobutenediylium 1,3-bis[3,8-dimethyl-5-(1-methylethyl)-1-azulenyl]-2,4-dihydroxy- bis(inner salt) (9CI); and mixtures thereof.

78. (previously presented) The article of claim 74, wherein the color forming article is optimized for development using infrared radiation having a wavelength of from about 750 nm to about 900 nm.

79. (previously presented) The article of claim 74, wherein the leuco dye is selected from the group consisting of fluorans, phthalides, amino-triarylmethanes, aminoxanthenes, aminothioxanthenes, amino-9,10-dihydro-acridines, aminophenoxazines, aminopheno-thiazines, aminodihydro-phenazines, aminodiphenylmethanes, aminohydrocinnamic acids and corresponding esters, 2(p-hydroxyphenyl)-4,5-diphenylimidazoles, indanones, leuco indamines, hydrozines, leuco indigoid dyes, amino-2,3-dihydroanthraquinones, tetrahalo-p,p'-biphenols, 2(p-hydroxyphenyl)-4,5-diphenylimidazoles, phenethylanilines, and mixtures thereof.

80. (previously presented) The article of claim 74, wherein the anti-oxidant is selected from the group consisting of vitamin E, vitamin E analogs, astaxanthin, ascorbic acid, carotene, and mixtures thereof.